State of New Mexico
LEGISLATIVE EDUCATION STUDY COMMITTEE

State Capitol North, 325 Don Gaspar, Suite 200
Santa Fe, New Mexico 87501
PH: (505) 986-4591 FAX: (505) 986-4338
http://legis.state.nm.us/lcs/lesc/lescdefault.asp

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MEMORANDUM

TO: Legislative Education Study Committee

FR: David Harrell

RE: STAFF REPORT: 7TH GRADE LAPTOP INITIATIVE: LFC REVIEW

The workplan for the Legislative Education Study Committee (LESC) for the 2006 interim includes a presentation on the 7th grade laptop initiative administered by the Public Education Department (PED) and the review of the initiative by the Legislative Finance Committee (LFC). Through this initiative, seventh-grade students and their teachers in public schools across New Mexico have received pre-loaded laptop computers for use both at school and at home.

Issues:

Purposes and Implementation of the New Mexico Laptop Learning Initiative

According to the *Implementation and Evaluation Plan* that PED published in October 2003, the New Mexico Laptop Learning Initiative (NMLLI) began at the direction of the Governor. Suggested by similar initiatives in other states – Maine, primarily – the program was based upon the premise that "technology and innovation play key roles in New Mexico's economic future and in enhancing learning opportunities for students and teachers."

- Also according to this plan, the primary purpose of the initiative is "to improve student learning," a purpose re-acknowledged in several subsequent documents. In addition, the plan states that another purpose of the initiative is "to advance the ideals of substantive educational reform."

- Noting that the decline in student achievement in middle schools is well documented, the implementation plan states, "numerous studies conclude that the effective use of technology improves writing skills, critical decision-making, problem solving, and learner motivation."

- With an initial appropriation of $1.7 million from the 2003 Legislature (followed by an additional $7.0 million over the next three years), the NMLLI began in school year 2003-2004 in six "exploration" schools serving 717 students and 80 teachers in grade 7. According to a press release that the Governor issued in January 2004, this distribution to the six exploration schools was "the first phase of the initiative, with the goal of providing computers to every 7th grader in the state."

- Since the first distribution, the program has been expanded through a competitive application process to provide nearly 5,000 laptops altogether to students and teachers at 29 school sites throughout New Mexico (see Attachment).

The extension of the program beyond the initial exploration schools was based upon requests for proposals (RFPs) in subsequent years that invited responses from school districts that "can demonstrate local capacity to support the use of laptop computers to enhance the daily learning experience [of seventh-graders] across all content areas" and that can address the numerous criteria in the RFP, among them:

- readiness of school staff to make the initiative a success;

- an assessment of the technological skills of teachers;

- a description of how the laptops will enhance existing educational opportunities;

- an explanation of policies for at-home use and insurance coverage;

- a description of the training planned for the families of 7th grade students who will receive the laptops; and

- a description of the technical infrastructure available at the school.

The RFP also asked for demographic and student achievement data to assist PED in developing baseline data to evaluate the program; however, as discussed under "Evaluation of the NMLLI," below, PED has not conducted an evaluation.

Beginning in school year 2005-2006, PED replaced the NMLLI-specific RFP with the New Mexico Educational Technology Consolidated Application, which combines the reporting and applications requirements for districts to apply for federal and state funds for several education technology programs, including the NMLLI.

- A notable difference between this consolidated application and the previous RFPs is the requirement to provide pre- and post-data on several "educational measurable objectives," among them:

  - the amount of written material that students produce;
  - the decrease in truancy;

- increases in students' attendance, completion of assignments, and student-produced multimedia projects;
- changes in subgroup reading and math proficiency rates; and
- increases in the number of teachers integrating laptops into lessons and curriculum.

- Also notable is the requirement that applicant districts indicate how they intend to incorporate the technology program into the district's Educational Plan for Student Success.

- For school year 2006-2007, the application deadline is June 21, 2006; and PED expects to make awards by June 30, 2006.

Funding History

As noted above, over a period of four years the Legislature has appropriated a total of $8.7 million for the NMLLI through capital outlay appropriations from the General Fund as follows:

- $1.7 million for FY 04;

- $4.0 million for FY 05;

- $1.0 million for FY 06; and

- $2.0 million for FY 07.

In addition to these statewide appropriations, the Legislature has also made several local appropriations:

- for FY 05, $50,000 for Albuquerque Public Schools "to upgrade the network with switches and laptops at Sandia High School";

- for FY 06, $47,500 for Hobbs Municipal Schools "for salaries and other expenses associated with a laptop technician to support the governor's laptop initiative";

- for FY 07, $50,000 for Tularosa Municipal Schools "to purchase and install educational technology related to the governor's laptop initiative, including related equipment and furniture" (the Governor vetoed another appropriation of $200,000 for the same purpose);

- for FY 07, $70,000 for Roswell Independent Schools "to purchase and install educational technology, including related equipment and furniture such as presentation carts, laptops, cameras and wireless tablets" at Berrendo Middle School (but the Governor vetoed this appropriation); and

- for FY 07, $45,000 to the Indian Affairs Department "to purchase laptop computers for needy students on the Navajo Nation in McKinley, San Juan and Socorro counties."

Finally, according to the LFC review, providing laptops to every seventh-grader in the state will cost approximately $37.3 million each year, an amount that should be considered a recurring expense if the program becomes permanent.

Evaluation of the NMLLI

Meaningful evaluation of laptop initiatives – also known as "ubiquitous computing" or "one-to-one computing" initiatives – has proved difficult, not only in New Mexico but also in other states and countries; nonetheless, the programs proliferate.

- According to one source, "The education technology research community's collective knowledge about one-to-one initiatives has not to date kept up with the rapid expansion of these initiatives or with their breadth."

- Challenges to meaningful evaluation include the difficulty of finding suitable measures for assessing the impact of laptops and of isolating a cause-and-effect relationship between laptops and student performance from all the other variables affecting student performance.

- Furthermore, some researchers suggest that trying to determine the laptops' effect on such quantifiable measures as student test scores or GPAs may be inappropriate anyway, emphasizing instead that laptops should be used to develop workplace skills and to help students work smarter, more efficiently in general. (For more information about evaluating laptop programs, see "Background: Initiatives in Other States," below.)

According to the *Implementation and Evaluation Plan,* PED had intended to evaluate New Mexico's program "through a significant data collection effort." Based on the Maine Laptop Learning Initiative, the plan anticipated a "mixed-method approach," employing such activities as web-based surveys, case studies in sample sites, focus groups, classroom observations, analysis of student work, analysis of teacher lesson planning, and analysis of school-level documents relating to broader policy issues. Finally, like the study in Maine, the evaluation in New Mexico was to focus on three "core areas": teachers and teaching, students and learning, and school and community perceptions.

Despite these intentions, however, there has been only one formal evaluation of the NMLLI thus far: conducted by New Mexico State University (NMSU), under contract with PED, during the first year of the initiative, from March to August 2004, covering what the evaluation report calls "a brief period (six weeks to three months) when students [in the six exploration sites] had computers."

- Relying on observations obtained through focus groups and interviews, as well as examinations of student work, lesson plans, and policy documents, NMSU found that teachers, students, and their communities supported the program and that they benefited from it, even over the short time that the laptops had been in use. "Teachers report more creative, customized, collaborative lessons; students are more interested in school and focused on their work; and parents have increased involvement with their student's education and communication with the school."

- A related benefit was the discounts on computer services and products that local businesses offered program participants.

- The NMSU evaluation concluded that the NMLLI "has the potential to become a critical educational investment for the state."

There has been no subsequent statewide evaluation because, according to PED, "it was not clearly stated in the legislation that the appropriation could be used in part for evaluation." In fact, there was never any legislation at all other than the series of appropriations designating certain amounts to purchase laptop computers for seventh-graders statewide.

However, NMSU did evaluate the program in Las Cruces Public Schools (LCPS) in school year 2004-2005. In general, the findings from this study mirror those of the previous year's report of the pilot sites throughout the state, with the addition of some particular observations about the initiative at LCPS: for example, teachers were developing communities of learners among themselves and students were helping each other with technical applications.

Findings of the LFC Quick Response Review

At the request of the LFC, staff conducted a "limited scope review" of the NMLLI and published the results in *Public Education Department Laptop Learning Initiative, Quick Response Review* (March 27, 2006). The review process consisted of interviews with key personnel, examinations of documents, analysis of data provided by PED, and site visits to selected school districts.

The review cites five areas considered critical to the success of a laptop initiative: planning, training and professional development, hardware and software, managing change, and program monitoring and evaluation. The review concludes that PED "did not adequately consider all these areas when requesting funding for and implementing the initiative."

One of the major findings of the review is that PED is not collecting data either to establish a baseline or to determine whether the NMLLI is improving student achievement.

- The review further states, "Without verifiable documented evidence of improved student performance and academic achievement, the program cannot demonstrate the need for continued funding." A study of numerous reviews and evaluations of laptop programs across the country reaches a similar conclusion: policymakers need reliable information "to establish priorities for external funding opportunities and [to] give guidance to programs . . . ."

- In response, PED agrees that such data are necessary but also contends that establishing reliable baseline data is contingent upon universal student identification numbers, implemented this year, and that "making defensible causal links" requires costly, highly skilled research. The department also notes its intention to work with its higher education partners to design a cost-effective study to guide legislative decisions.

The PED response also identifies eight "key recommendations" addressing such issues as funding contingent upon evidence of increased student achievement, appropriation language that allows expenses for evaluation, and requirements that applicant districts focus on expected outcomes and demonstrate how technology will be integrated into the curriculum. PED agrees

with all but one of these recommendations. That recommendation is to re-negotiate the purchase agreement with the vendor to eliminate "unnecessary add-ons, excessive warranties and teachers training which can be purchased elsewhere at a better price." In response, PED defends its "best practice" procurement process of bundling together "everything students and their teachers require in order to be successful."

Elsewhere in its response, PED has selected a number of other points from the review for either elaboration or rebuttal.

- For example, in response to the LFC estimate that providing laptops to all seventh-graders and their teachers will cost approximately $37.3 million per year, PED notes its recommendation that the language be broadened to read "laptops and other personal computing devices" to allow the purchase of newer, often less expensive, devices that were unavailable when the NMLLI was implemented.

- As another example, the LFC review questions the purchase of a five-year extended warranty on each computer, which, together with the automatic one-year warranty, exceeds the computer's useful life of four years. In response, PED contends that the "refresh rate" – the rate at which funding has allowed the replacement or upgrades of student computers – in New Mexico has held steady at 18 years for the past several years, suggesting that warranty coverage for six years is appropriate.

As evidence of the effectiveness of the NMLLI, PED includes in its response indications of increased teachers' proficiency in four "21st Century Skills": general computer skill level, operating a computer and peripheral devices, multimedia content creation, and applying tools for enhancing professional productivity. The PED response also cites changes in students' test scores in selected districts since the implementation of the initiative; however, it is difficult to ascertain the extent to which the NMLLI effected the changes, and some of them are based on projections rather than actual scores.

Finally, as the LFC requested, PED has submitted a corrective action plan that outlines changes in the administration of the NMLLI to address such issues as evaluation of student performance through quantitative and qualitative data analysis, specific expectations of NMLLI students as opposed to non-NMLLI students, additional sources of funding, and improved site visits.

Laptops in the School Districts

PED explains that, when the NMLLI began, school districts, students, and their families received verbal assurance that seventh-graders who received the laptops would be able to keep them until graduation. However, in December 2005, PED notified school districts that, because of funding levels lower than anticipated, districts would have the discretion to determine whether the laptops followed the students or remained in grade 7 for use by subsequent students in that grade. "Districts are advised," the PED letter states, "that the decision to retain laptops at the middle school, or allow them to move forward with original 7th grade laptop students is within their authority."

Several school districts – primarily small ones – have reported positive results from the NMLLI overall:

- Truth or Consequences Middle School teachers report an increase in student achievement, particularly in math, and greater ease with technology among students and teachers alike;

- Texico Public Schools reports that students in general are demonstrating greater efficiency, expertise, and personal responsibility and that English language learner students in particular will benefit because the new science textbooks have CDs in both English and Spanish;

- Wagon Mound Public Schools reports an increase in the attendance rate, from 95 percent to 98 percent; and

- Tatum Public Schools reports that daily grades of students with laptops have increased 86 percent.

In at least one case, however – Las Cruces Public Schools – the laptops have been a source of contention.

- In January 2006, the interim superintendent notified parents and students that funding constraints compelled the district to revise its policy so that the laptops previously received would be assigned to grade-level teams as classroom tools and "no longer be assigned to individual students on a permanent basis." Furthermore, each of the participating schools would have discretion for "over-night home check-out" of the laptops.

- Another issue was the district's discovery that a number of students had used the laptops to access inappropriate material.

- These issues notwithstanding, district officials say that the instance of abuse is limited and that, overall, the district is pleased with the laptops' usage, both by students and their families.

Background:

Initiatives in Other States

Nationwide, according to a recent synthesis of nearly 50 articles about programs across the country, the goals of one-to-one computing initiatives focus on one or more of four outcomes:

- improving students' academic achievement (the primary goal of the New Mexico initiative);

- increasing equity of access to digital resources and thus reducing the "digital divide";

- increasing the economic competitiveness of an area by preparing its students for high-tech careers; or

- enhancing the quality of instruction.

To achieve one or more of these goals, school districts in other states have been providing laptops to seventh- and sometimes eighth-grade students at least since the 1990s. According to a report in the May 10, 2006 issue of *Education Week*, nearly one-fourth of school districts nationwide and nine states have now implemented one-to-one laptop programs. In some of these cases evaluations have been part of the initiatives since their beginning. In three in particular – the Beaufort County (South Carolina) School District, the state of Maine, and Henrico County (Virginia) Public Schools – extensive longitudinal evaluations have found generally positive results for students and teachers alike.

Moreover, the evaluations of laptop initiatives elsewhere indicate that the programs hold much promise for enhancing student achievement; however, that promise is not always realized.

- Some studies, for example, have suggested that providing students with "ubiquitous access to wirelessly connected computers has the potential to transform learning environments and improve student learning outcomes." More specifically, these researchers anticipate such benefits as enhanced collaborative learning and increased class participation.

- In practice, however, these benefits do not always accrue, often because of insufficient technological capacity in schools or among teachers or because of policies that fail to ensure the full integration of technology into the curriculum.

Furthermore, not everyone is convinced that one-to-one laptops are a good investment.

- A recent study by an economics professor at the Massachusetts Institute of Technology concluded that, although students and teachers enjoy using the laptops, the machines have had little effect on test scores.

- Noting the mixed results from an initiative in Ohio, researchers from Syracuse and Michigan State universities were unable to determine overall whether the program was a worthwhile investment.

- A study in England found that devices similar to laptops have had a small and short-lived effect on student skills.

A point made by the National Research Council helps put these various findings in context: "Rarely does one study produce an unequivocal and durable result." Rather, a synthesis of varied findings is helpful in reaching conclusions and making decisions.

- The synthesis of some 50 articles noted above concludes that few studies have offered "research-based evidence that determines the true effectiveness of the programs." More often, these studies rely on self-reported survey data about such factors as student motivation, engagement, or organizational skills that the researchers did not attempt to quantify.

- This study also notes that, while the most promising results have appeared in computer literacy and writing, the effect of laptops upon student achievement in core subjects remains uncertain; and it adds that, to be effective, the one-to-one initiatives must be "part of a larger, more comprehensive effort to improve instruction." (A case in point is

the SchoolStat system currently in use in the Philadelphia public schools. With this system, teachers have instant access to a wide array of student-level information – test scores, attendance records, at-risk factors – that helps them to identify areas of academic weakness and to adjust their lesson plans or instructional methods accordingly. As a result, students have achieved "substantial gains in reading scores over the past two years.")

Finally, in hopes of filling this data void a number of studies are underway throughout the country:

- two professors from Boston College are studying the "actual outcomes" of the laptop project at four middle schools in one Massachusetts county;

- a school district in Virginia has begun a three-year study of its laptop project for middle and high school students;

- a school district in Kentucky has given laptops to all of its high school freshmen, with the intention to evaluate that initiative before expanding it to other grades; and

- Maine is collaborating with the Educational Testing Service to develop information-communication-technology assessments.

Other Considerations

While evaluations of laptop initiatives may have raised more questions than answers, they have, at least, identified certain keys to success.

- The primary key to the success of such an initiative seems to be proper professional development for the teachers using the laptops, especially professional development that focuses on helping teachers integrate technology into their instructional practices. And teachers helping other teachers seems to be a particularly effective means of providing this kind of professional development.

- Also important are leadership and technical support.

  - According to a report distilling the lessons learned from laptop initiatives in several states, New Mexico among them: "[s]trong leadership is needed at all levels, from the classroom and the school to the district and the state."

  - Several studies have noted that a practical source of technical support can be the students themselves. For example, Henrico County, Virginia, the largest district-funded laptop program in the country, has established a help desk of tech-savy students who resolve technical problems and earn community service points for their efforts.

- On the matter of funding sources, one study has found that successful programs use multiple sources: federal, state, local, and private.

As with other aspects of education, special education students present different challenges and circumstances.

- A study of laptop use by seventh-grade students with disabilities participating in the Maine Learning Technology Initiative found that, overall, special education teachers regarded the laptops as highly beneficial, especially in terms of students' overall engagement as well as their motivation, their participation in class, and their interaction with other students and with teachers.

  - A particular benefit was an increase in both the quality and quantity of the writing done by special education students. For many of them, the laptops alleviated the motor coordination challenge posed by writing with pen or pencil and "allowed them to produce work that was easily edited and [that] looked as good as the work of their non-disabled peers."

  - The most often-cited disadvantage was that these students, more often than students in general, became either distracted by the technology or frustrated with it when "glitches" occurred.

- Likewise, the program in Wagon Mound, New Mexico has found particular benefits for students with special needs through access to tutoring programs, through adaptive technology or software, and through the use of assignment logs rather than reliance upon the student's memory. Similar benefits have accrued in Tatum Public Schools, which has found the laptops to be "non-threatening to students with disabilities" because they allow the students to work at a comfortable, consistent pace.

Some educators believe that providing access to technology through laptop programs can help narrow the achievement gap between rich and poor: "Educational leaders have argued that providing students with a computer with Internet access gives everyone the ability to use up-to-date learning resources that before were available only to those who lived close to a library or benefited from school budgets that allowed for regular purchases of new textbooks."

Finally, although laptops have begun appearing in other grades, especially when students keep them until graduation, the initiatives, whether large-scale or small-scale, have almost invariably been implemented in the 7th grade.

- In correspondence with LESC staff, the National Conference of State Legislatures suggests two reasons for the focus on 7th grade: that middle school is the time when students' test scores typically drop (a phenomenon noted in the PED implementation plan as well) and that focusing on students in middle school may help guide them toward graduation.

- A private school in Oregon that implemented a pilot program in 7th grade in school year 2005-2006 adds these considerations: as "an important time of change and choice," the middle school years provide a good time "to define the correct balance of digital and traditional tools and learning experiences"; and beginning in 7th grade would allow an easy continuation in 8th grade if the program proves beneficial.

Policy Options:

The circumstances surrounding the NMLLI suggest that legislators have at least four policy options:

1. continue the present policy of expanding the program incrementally based largely upon anecdotal data showing positive results;

2. continue to expand the program incrementally once quantitative data are available and those data show that the program is accomplishing its purpose "to improve student learning";

3. expand the program statewide once quantitative data are available and those data show that the program is accomplishing its purpose "to improve student learning"; or

4. discontinue the program, at least until supporting quantitative data are available, and redirect the funding to other initiatives that seem to have a more direct effect upon student learning.

Presenters:

For this presentation:

- Mr. J. Scott Roybal, Performance Auditor, LFC, will discuss findings and recommendations of the LFC review of the NMLLI;

- Dr. Veronica C. García, Secretary of Public Education, and Dr. Catherine Cross Maple, Deputy Secretary for Learning and Accountability, PED, will discuss the NMLLI and the department's response to the LFC review;

- Mr. Casey Benavidez, Technology Coordinator, Wagon Mound Public Schools, will discuss the NMLLI as implemented in that district; and

- Dr. Marcy Oxford, Grants Specialist, Las Cruces Public Schools, will discuss issues related to the NMLLI in that district and the district's efforts to resolve them.

Questions the committee may wish to consider:

1. What have been the major benefits of the NMLLI thus far? The major obstacles to success? The major problems?

2. What adjustments should PED make in its administration of the NMLLI for school year 2006-2007 to help ensure the success of the initiative? What adjustments should participating districts make?

3. To what extent is district size a factor in the success or effectiveness of the NMLLI?

4. Do any of the findings or recommendations in the LFC review of the NMLLI suggest the need for a full-scale audit of the initiative?

5. What legislation, if any, is needed to ensure the proper implementation, administration, and evaluation of the NMLLI?

6. To evaluate the NMLLI, is it necessary for PED to contract with a third party or might PED conduct the evaluation itself?

7. What is the status of PED's intended collaboration with its higher education partners to design a cost-effective study?

8. To what extent has the NMLLI become "a critical educational investment for the state," as predicted by the NMSU evaluation of the first year of the initiative?

9. If the program continues, should funds from other sources – federal, local, or private – be expected to supplement state funds?

10. What is the likelihood that laptops or other electronic devices will eventually replace textbooks?

11. Do the results of the NMLLI thus far merit continuation of the program?

12. Should laptops and similar electronic devices be considered and funded as instructional material?

ATTACHMENT

7th Grade Laptop Initiative: Number of Units Distributed, FY 04-FY 06

District/ Site	FY 04	FY 05	FY 06	Total
Alamogordo (Holloman Middle School)		92	105	197
Albuquerque Public Schools (Polk Middle School)		141		141
Albuquerque Public Schools (Southwest Secondary Learning Center)	40	40		80
Animas		24		24
Bloomfield Schools (Mesa Alta Jr. High)		294		294
Carrizozo (Carrizozo Middle School)		35	18	53
Chama Valley Independent Schools (Chama Middle School)	28	22		50
Chama Valley Independent Schools (Tierra Amarilla Middle School)	28	22		50
Cloudcroft Municipal Schools (Cloudcroft Middle School)	46	35	36	117
Cuba			55	55
Gallup McKinley (Tohatchi Middle School)	92	95		187
Hobbs Municipal Schools (Highland Jr. High)	322	322		644
Las Cruces (Picacho Middle School)	230	237		467
Las Cruces (San Andres Learning Center)	31	25		56
Las Cruces (Sierra Middle School)		373		373
Las Cruces (Zia Middle School)		269		269
Lovington Municipal Schools (Taylor Middle School)	232	232	230	694
Mosquero Municipal Schools (Mosquero Middle School)	12	5	15	32
NM School for the Deaf (Santa Fe Campus)	12	8		20
Pecos Independent Schools/Pecos Middle School	83	60		143
Reserve Schools (Reserve High School)	17	12		29
Santa Rosa Consolidated Schools (Santa Rosa Middle School)	54	50		104
Truth or Consequences (T or C Middle School)		157	150	307
Tatum Municipal Schools (Tatum Jr. High)	46	31	41	118
Texico Municipal Schools		53	59	112
Tularosa Middle School		95		95
Wagon Mound Public Schools (Wagon Mound Jr. High)	28	0	8	36
West Las Vegas			39	39
Zuni (Zuni Middle School)		165		165
Total	**1301**	**2894**	**756**	**4951**

FY 04 Pilot Site

Source: LESC from PED Data